HIGHER INCIDENCE OF LOW BIRTH WEIGHT INFANTS AMONG MALAY WOMEN WITH PERIODONTITIS IN KOTA BHARU, KELANTAN

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ABSTRACT

The causes of low birth weight (LBW) are complex and multifactorial. Current epidemiological and microbiological studies have suggested that maternal periodontal infection may increase the risk of delivering LBW infants. The objective of this prospective cohort study was to determine the incidence of LBW infants among pregnant women with periodontitis. Malay pregnant women were recruited from two selected Klinik Kesihatan Ibu dan Anak (KKIA) in the district of Kota Bharu. Of 472 women studied, 232 who had periodontitis were classified as being exposed, while the rest who did not have periodontitis were in the non-exposed group. The incidence of LBW was 14.2% (95% CI: 9.7-18.8) in women with periodontitis, and 3.3% (95% CI: 1.1-5.6) in women without periodontitis. Pregnant women with periodontitis are at higher risk of delivering LBW infants ($p<0.001$). This knowledge should increase physician and patient awareness to the relevance of oral infections. Ultimately, it should help to establish the groundwork for closer communication between the medical and dental colleagues to improve the quality of antenatal care towards achieving our vision and goals for health.

Keywords: *low birth weight, Malay, periodontitis, pregnant*

INTRODUCTION

The causes of low birth weight (LBW), a birth weight of less than 2500gm LBW, are complex and multifactorial (World Health Organization, 1984). Associated maternal factors for LBW include genetic, socio-demographic and obstetric factors, nutritional status, morbidity, toxic exposures and antenatal care (Kramer, 1987). In the last decade, many investigators have been interested in studying the role of subclinical maternal infection in preterm labour, and chronic oral infection like periodontitis has been suggested as a possible risk factor for pre-term low birth weight deliveries (Offenbacher *et al*., 1998). Although the mechanism by which periodontitis may cause LBW remains unclear, based on the current understanding that inflammatory mediators that occur in periodontitis also play an important role in the initiation of labour, this association is biologically feasible (Madianos *et al*., 2001).
The objective of this prospective cohort study was to determine the incidence of LBW infants among pregnant women with periodontitis.

METHODOLOGY

This study was a prospective cohort study conducted from December 2003 to March 2004. Exposed group comprised of pregnant women with periodontitis while the non-exposed group comprised of those without periodontitis. The selected centres, KKIA Bandar Kota Bharu and KKIA Wakaf Che Yeh, were randomly assigned for selection of non-exposed and exposed groups respectively. Screening periodontal examinations were performed on all pregnant women attending both KKIA during the study period who fit the inclusion and exclusion criteria for screening. Study subjects were then selected using systematic random sampling from the respective sampling frames. The inclusion criteria for screening of non-exposed subjects were pregnant women in the second trimester (14 to 27 weeks' gestation). However, due to ethical consideration, exposed subjects were selected only from those in the third trimester (at least 28 weeks' gestation). We excluded patients with potential confounders such as those who smoke cigarettes and diagnosed with pre-pregnancy diabetes, or those with known risk factors for LBW such as chronic hypertension, alcohol use during pregnancy, and having multiple foetuses as confirmed by ultrasound examinations. Patients with history of periodontal treatment during the current pregnancy, patients with fewer than 20 teeth and those who were taking antibiotics for any reason were also excluded as these might lead to misclassification of exposure status. For safety reason, patients who require

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prophylactic antibiotics for any periodontal procedures were also not screened for the study. Clinical attachment loss (CAL) and probing depth (PD) in millimetre (mm), and presence of gingival bleeding on probing (BOP) were determined by clinical periodontal examination (American Academy of Periodontology, 1996). The presence of 4 or more sites with PD 4mm or higher, and CAL 3mm or higher at the same site with presence of BOP were diagnosed as periodontitis (Lopez ***et al.***, 2002). Data on infant birth weight was taken from the home-based maternal health record.

RESULTS

Of 500 women enrolled in the study, 28 (5.6%) were either lost to follow-up or excluded for various reasons. Of the remaining subjects, 240 were in the group of periodontally healthy women and 232 were in the group with periodontitis. Table 1 shows the comparison of the incidence of LBW at 95% Confidence Interval (CI) between subjects exposed and not exposed to periodontitis during pregnancy. The total incidence of LBW was 8.7%. Of these, 14.2% of LBW occurred among subjects with periodontitis compared with only 3.3% incidence among those without periodontitis. Subjects exposed to periodontitis had significantly higher incidence of LBW as compared with the non-exposed subjects (OR=4.81 95% CI: 2.17-10.65). All of LBW deliveries among the non-exposed subject are of moderate severity (1501–2499g) while 6.1% of the LBW infants from periodontitis mothers could be classified as very severe (1001–1500g). None of infants from all subjects were extremely LBW (1000gm or less). Of all infants, 19 (4%) were delivered prematurely, and 18 of them were also LBW. Sixteen (84.2%) premature infants were delivered by mothers with periodontitis as compared to only three (15.8%) premature deliveries among mothers with healthy periodontium.

Table 1: Incidence of LBW in 232 subjects with periodontitis and 240 subjects without periodontitis

Periodontal disease status	*n*	*LBW Frequency (%)*	*95% CI*	*OR (95% CI)*	*p value**
Subjects without periodontitis	240	8 (3.3)	9.7 – 18.8		
Subjects with periodontitis	232	33 (14.2)	1.1 – 5.6	4.41 (2.17-10.65)	<0.001

'Chi-square test

DISCUSSION

The findings of this study support the research hypotheses that there was a significantly higher incidence of LBW among pregnant women with periodontitis compared to those without periodontitis. The total incidence of LBW found in this study was 8.7%. This figure was slightly lower than the 10% total incidence of LBW in general Malaysia population as estimated by Unicef (2004). However, the incidence of LBW in this study was higher than the results of a prospective study by Lopez ***et al.*** (2002), in which, the incidence was only 1.9% in their total subjects and 3.4% in women with periodontal disease. Of all live births in this study, 19 (4.0%) were born prematurely, and 18 (94.7%) of these were LBW. These findings are in accordance with evidence from a study by Secher ***et al.*** (1987) which showed that preterm infants weigh less than infants of the same gestational age who remain ***in-utero,*** meaning that many preterm infants were also growth-retarded and hence, LBW. The risk of having LBW attributed to maternal periodontitis in the total population was approximated at 67% using formula given by Gordis (1996) based on 10% incidence of LBW in Malaysia (Unicef, 2004). Thus, if there is an effective nationwide prevention program eliminating periodontitis among pregnant mothers, a maximum of 67% reduction in the incidence of LBW could be achieved in Malaysian general population. From a public health perspective, this is an important answer for the policy-makers and those responsible for funding the preventive programs. The amount of total impact of a proposed prevention program on the community and how is it going to reduce the burden and suffering in the population are among the major concerns. However, since the reference population in this study was pregnant women Kota Bharu, Kelantan, the attributable risk should be interpreted with caution as it can only be used as an approximation and might not be the

true risk for Malaysian population. In conclusion, LBW incidence among pregnant women with periodontitis was significantly higher than those with healthy periodontium. The incidence of LBW in the general population attributed to maternal periodontitis was also high. As such, oral health services should be an integral component of all health programs. All physicians should increase their awareness and attention to the medical relevance of dental infections and oral diseases. Thus, it is timely for medical and dental colleagues to work together and share knowledge so that the appropriate diagnosis and treatment can be provided to the patients.

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